AI 1103 : Probability and Randomm Variables

ASSIGNMENT 1

AI20BTECH11026

Problem: A jar contains 24 marbles, some are green and others are blue. If a marble is drawn at random from the jar, the probability that it is green is 2 3 . Find the number of blue balls (marbles) in the jar. (Prob, 1.1)

Solution:

Let the random variable $X = \{0, 1\}$ denote the outcome of the given experiment.
$X = 1$ if the marble picked turns out *Green*.
$X = 0$ if the marble picked turns out *Blue*.
It is given that,

$$P(X = 1) = \frac{2}{3}$$
$$\therefore P(X = 0) = 1 - P(X = 1)$$
$$\therefore P(X = 0) = 1 - \frac{2}{3}$$
$$\therefore P(X = 0) = \frac{1}{3}$$
$$Now,$$
$$n(X = 0) + n(X = 1) = 24$$
$$\because P(X = 0) = \frac{n(X = 0)}{n(X = 0) + n(X = 1)}$$
$$\therefore n(X = 0) = P(X = 0)\,(n(X = 0) + n(X = 1))$$
$$\therefore n(X = 0) = \frac{(1) \times (24)}{3}$$
$$\therefore n(X = 0) = 8$$

$\therefore$ Theoretical number of blue balls is 8.

Link to the code:

`https://github.com/tanayyadav28/Assignments/blob/main/Assignment%201/code/Assignment%201.py`